Chapter 25: Cumulative Impacts

25.1 Introduction

The Council on Environmental Quality (CEQ) regulations require an assessment of cumulative impacts. These regulations ensure that the proposed Mountain View Corridor (MVC) project and other federal, state, and private actions will be evaluated with regard to cumulative impacts.

Cumulative impacts are defined by the CEQ regulations in 40 Code of Federal Regulations (CFR) 1508.7. The CEQ regulations define cumulative impacts as "the impact on the environment which results from the incremental impact of the [proposed] action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time." Cumulative impacts include the direct and indirect impacts of a project together with the reasonably foreseeable future actions of other projects.

Direct impacts are defined by the CEQ regulations as "effects which are caused by the [proposed] action and occur at the same time and place." For this project, an example of a direct impact would be taking a wetland for right-of-way for an interchange.

Indirect impacts are defined by the CEQ regulations as "effects which are caused by the [proposed] action and are later in time or farther removed in distance, but

are still reasonably foreseeable. Indirect effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate…" For this project, an example of an indirect impact could be urban development on farmlands or wetlands as a result of new access provided by the project.

Cumulative impacts also include the impacts of "other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions." For this project, an example of a past action in the MVC study area is the Kennecott mine operations. Examples of reasonably foreseeable future actions include the planned Daybreak development in South Jordan and the planned widening of 3500 South in Salt Lake County. These reasonably foreseeable future actions are independent of the MVC project, but must be considered in this Environmental Impact Statement (EIS) as part of the cumulative impacts analysis. The future actions considered in this EIS are listed in Table 25.3-1, Present and Reasonably Foreseeable Transit and Roadway Actions, on page 25-9.

25.2 Methodology for Determining Cumulative Impacts

The methodology for determining the cumulative impacts of the proposed MVC project is based on *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997).

This chapter provides a general overview of the methodology used to conduct the cumulative impact analysis. The specific analyses of direct impacts are provided under the appropriate resource chapters in this EIS.

25.3 Cumulative Impacts Analysis

25.3.1 Important Cumulative Impact Issues Associated with the MVC

The MVC project could affect resources either directly or indirectly. Resources can be elements of the physical environment, species, habitats, ecosystem parameters and functions, cultural resources, recreation opportunities, the structure of human communities, traffic patterns, or other economic and social conditions. However, according to CEQ's cumulative impacts guidance, the cumulative impact analysis should be narrowed to focus on important issues at a national, regional, or local level. The analysis should look at other actions that could have similar effects and whether a particular resource has been historically affected by cumulative actions.

25.3.1.1 Cumulative Impact Concerns Identified during Scoping

As part of the MVC EIS process, scoping meetings were held with the public and resource agencies to help identify issues to be analyzed in the EIS. The comments received during the public and agency scoping period were reviewed to determine if any important issues were identified.

Public Concerns. The public identified the following main concerns regarding cumulative impacts:

- Loss of farmlands
- Loss of wetlands, wildlife areas, and water bodies
- Continued degradation of air and water quality

Concerns of Local Municipalities. Meetings were held with local municipalities in the MVC study area. The main issues identified by community officials included preserving wetland and wildlife areas and concern about the degradation of water quality.

Concerns of Resource Agencies. Several methods were used to solicit potential issues from the resource agencies. First, during the MVC scoping period, letters were sent to the agencies asking them to identify issues to be studied in the EIS. Second, a resource agency scoping meeting was held on June 5, 2003, to identify potential issues and develop initial methodologies for conducting the cumulative impacts analysis. Third, after the scoping meeting, ongoing coordination with the resource agencies continued to refine issues and EIS methodologies for analyzing cumulative impacts. Over the course of the scoping period, the resource agencies identified the following initial issues:

- Loss of wildlife habitat along the Utah Lake floodplain wetlands
- Loss of wildlife habitat in western Salt Lake County
- Loss of playa wetlands in Salt Lake County and wetlands along Utah Lake
- Loss of wetlands and wildlife habitat along the Jordan River
- Indirect impacts to regional air and water quality
- Degradation of water quality, increase in stormwater flow, and loss of stream ecology

Finally, three resource agencies (U.S. Environmental Protection Agency [EPA], U.S. Fish and Wildlife Service [USFWS], and U.S. Army Corps of Engineers [USACE]) were given the MVC cumulative impact approach in March 2005 to review and comment and to determine if the proposed list of resources to be analyzed for cumulative impacts was acceptable. The agencies concurred with

the cumulative impact methodology and resources to be analyzed (MVC Management Team 2005; Defreese 2005; Hermann 2005).

25.3.1.2 Important Cumulative Impacts Issues

Based on the scoping process and the potential for direct impacts from the MVC project, the MVC team identified four important cumulative impacts issues, which are the focus of the cumulative impacts analysis in this EIS. These issues are:

- Ecosystems (wetlands and wildlife habitat)
- Air quality
- Water quality
- Farmland

Impacts to threatened and endangered species are also an important issue in the MVC study area. The main sensitive species that is known to be in the MVC study area is Ute ladies'-tresses (*Spiranthes diluvialis*), which is federally listed as a threatened species. Because this species depends on wetlands, the cumulative effects analysis for wetlands also provides a trend for the Ute ladies'-tresses in the area. Therefore, the potential cumulative impacts to this species are presented under the wetland analysis in Section 25.4.4, Ecosystem Resources.

25.3.1.3 Urban Growth and Land Use

The potential cumulative impacts on the resources under study depend on future changes in land use in the MVC study area and the direct impacts from the MVC project. The cumulative impact analysis considered the anticipated changes in land use from regional growth and from direct and secondary (induced) growth caused by the MVC project. The past and present changes in land use in the MVC study area are one of the main factors causing the loss of wetlands, wildlife habitat, and farmlands and the degradation of water and air quality.

The potential indirect impacts to land use caused by the MVC project are analyzed in Chapter 24, Indirect Effects. In addition, the impacts of other reasonably foreseeable actions are being considered for the resources being studied (see Table 25.3-1, Present and Reasonably Foreseeable Transit and Roadway Actions, on page 25-9).

25.3.2 Geographic Scope for the Analysis

The geographic scope of the analysis is defined in the chapter for each specific resource considered for cumulative impacts. The geographic scope was determined by establishing the area of project impacts and determining the geographic areas occupied by the affected resource outside the MVC project study area.

25.3.3 Timeframe for the Analysis

The timeframe for the cumulative impacts analysis includes past and future time periods. The time period for the past impact analysis varies by resource depending on the timeframe for which historical data were available. The time period for the future impact analysis extends from the present day to the reasonably foreseeable year of 2030.

The time period for the past analysis was determined by the information available for each resource. For some resources, data were available for only the past 10 to 20 years, while for other resources data were available back to early European settlement of the Wasatch Front. In addition, for some resources such as air quality, it was more appropriate to begin the analysis when data were available from monitoring sites rather than at the onset of modern settlement when air quality records were not available. The specific past-year timeframe for each resource analysis is described in each specific resource chapter and is listed below:

- Farmland – 1900 to 2030
- Air quality – 1975 to 2030
- Water quality – 1970 to 2030
- Ecosystems (wetlands and wildlife habitat) – 1850 to 2030

25.3.4 Other Actions Affecting the Resources, Ecosystems, and Human Communities of Concern

This section provides a brief overview of the past actions and present and reasonably foreseeable actions that contributed or could contribute to cumulative impacts. Many of the baseline conditions relevant to cumulative impacts are described in detail in each chapter in this EIS.

25.3.4.1 Past Actions

Salt Lake and Utah Counties have experienced major urban expansion resulting in large residential, commercial, and industrial centers along with associated infrastructure such as freeways and surface streets. The 1850 U.S. census found

that Salt Lake County had a population of about 6,200 people and Utah County had a population of about 2,000 people. As shown in Chart 25-1, the population has increased dramatically since 1850, and this steady increase has led to continuing urban expansion (Utah Governor's Office of Planning and Budget 2000).

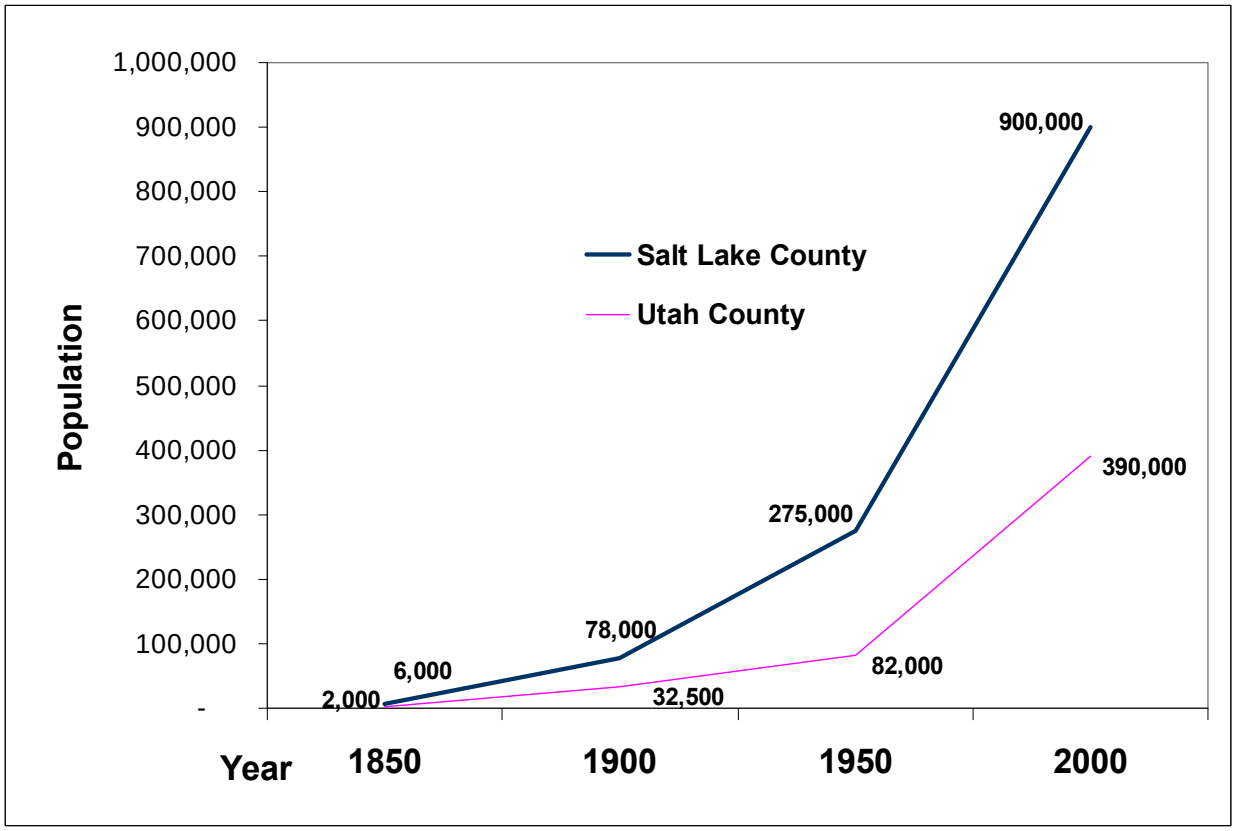

Chart 25-1. Population Growth in Salt Lake and Utah Counties, 1850 to 2000

Within the MVC study area, the population growth has led to about 30,000 acres being developed for urban uses out of the total 178,500 acres (both developable and undevelopable lands). For comparison, Salt Lake County has had about 172,000 acres developed for urban uses out of 489,000 acres in the county, and Utah County has had about 77,000 acres developed out of 1,372,000 acres in the county. Many of the undeveloped areas consist of undevelopable land such as the Wasatch Mountains and Utah Lake. The urban development has caused the loss of farmland, wetlands, and wildlife habitat. The urban growth has also degraded regional air and water quality. The amount of land available for growth in Salt Lake and Utah Counties is limited by the surrounding mountains, the Great Salt Lake, and Utah Lake. Figure 25-1, Greater Wasatch Area Developed Land 2006, provides an overview of developed areas along the Wasatch Front in 2006.

Major past actions in the Salt Lake County portion of the MVC study area include the establishment of the Kennecott open-pit mine along the western edge of the Salt Lake Valley in the early 1900s. The establishment of the mine led to a major influx of population between 1900 and 1910, which established small residential areas in Magna and other locations along the western foothills. Though the population steadily grew in the western side of the Salt Lake Valley, it remained largely agricultural until the 1960s.

In the early 1970s, the western side of the Salt Lake Valley in the MVC study area began to develop rapidly. Major transportation expansion in the MVC study area occurred in the 1960s with the construction of Interstate 15 (I-15), Interstate 80 (I-80), and State Route (SR) 201. The western portion of Interstate 215 (I-215) was constructed in the 1980s and Bangerter Highway west of I-15 in the 1990s. These transportation projects served the main employment center of Salt Lake City and the supporting suburban areas that developed south, southeast, and north of the city center. The Salt Lake City International Airport was first developed in the 1930s with a major expansion between 1975 and 1980. Major rail freight lines were established in western Salt Lake Valley in the early 1900s to support mining operations.

In the Utah County portion of the MVC study area, most growth has been suburban. Most growth in this area started to occur in the 1980s. Many of the wetlands north of Utah Lake were eliminated with the introduction of farming in the 1900s and, starting in the 1980s, these farmlands along with additional wetlands were affected by urban development north of the lake.

25.3.4.2 Present and Reasonably Foreseeable Actions

Several steps were taken to determine potential present and future actions to consider in the cumulative analysis. The first step involved coordinating with the Utah Department of Transportation (UDOT), the Utah Transit Authority, the Wasatch Front Regional Council, and the Mountainland Association of Governments to help identify other transit and roadway projects that could result in cumulative impacts when combined with the MVC project. This step included reviewing environmental documents that were recently completed or are in progress. In addition, UDOT held multiple meetings with project managers to identify current and upcoming projects and the scope of the potential impacts. The intent of these meetings was to address region-wide issues related to cumulative impacts.

Next, municipalities in the MVC study area were contacted to help identify major local projects including private developments. Finally, Envision Utah was contacted to gather information about potential long-term (2030) growth trends

anticipated for the Wasatch Front including the anticipated number of acres of land that will be developed. Figure 25-1, Greater Wasatch Area Developed Land 2006, and Table 25.3-1 and Table 25.3-2 below show the major projects identified as other actions to be considered that could affect these resources in the MVC study area. Figure 25-3 through Figure 25-5, Present and Reasonably Foreseeable Actions, show the locations of these projects in both Salt Lake and Utah Counties.

As noted in Table 25.3-2, about 40,000 additional acres are expected to be developed in the next 30 years in Salt Lake and Utah Counties, based on a current urbanized acres of about 30,000 acres and a future current urbanized acres of about 70,000 acres in 2030 if current trends continue (Envision Utah 2003). This developed land includes the proposed future residential and commercial developments and the approximately 250 roadway and transit projects identified in the Wasatch Front Regional Council's long-range transportation plan (WFRC 2003), as well as the approximately 120 projects in the Mountainland Association of Governments' long-range transportation plan (MAG 2005). Many future development or infrastructure projects are not listed in Table 25.3-1 and Table 25.3-2 because they are not yet included in adopted plans. However, these projects are included in the expected 40,000 acres of overall development. Because most of the projects in the long-range transportation plans are in the planning stages, specific impact information could not be obtained.

Table 25.3-1. Present and Reasonably Foreseeable Transit and Roadway Actions

Project or Activity	Description	Impacts	Project Status
Salt Lake County Projects – Transit			
1. Weber County to Salt Lake City Commuter-Rail Project[a,b] (Utah Transit Authority 2005a)	Commuter rail on existing tracks from Pleasant View in Weber County to Salt Lake City in Salt Lake County. New station locations.	• Farmland – 6.41 acres of direct impacts; 39.2 acres of indirect impacts • Air Quality – Conforms to State Implementation Plan • Water Quality – No increase in overall pollutant levels • Wetlands – 19.3 acres • Wildlife Habitat – No substantial changes • Threatened and Endangered Species – None	Construction
2. Airport to University West-East Light-Rail Project, Salt Lake County[a] (Utah Transit Authority 1999)	Light rail from Salt Lake City to the Salt Lake City International Airport.	• Farmland – None • Air Quality – Conforms to State Implementation Plan • Water Quality – No increase in overall pollutant levels • Wetlands – 4.89 acres • Wildlife Habitat – No substantial changes • Threatened and Endangered Species – None	Planning
3. West Valley Light-Rail Transit Project, Salt Lake County[a] (Utah Transit Authority 2007)	New light-rail line from the 2100 South light-rail station to the West Valley City Center.	• Farmland – None • Air Quality – None • Water Quality – No increase in overall pollutant levels • Wetlands – 0.72 acre • Wildlife Habitat – 15.28 acres • Threatened and Endangered Species – None	Planning

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Project or Activity	Description	Impacts	Project Status
4. West Jordan Light-Rail Extension (Mid-Jordan Line), Salt Lake County[a] (Utah Transit Authority 2005b)	New light-rail line from the 6400 West light-rail station to South Jordan.	• Farmland – None • Air Quality – Conforms to State Implementation Plan • Water Quality – No increase in overall pollutant levels • Wetlands – 0.32 acre • Wildlife Habitat – 173 acres of previously disturbed habitat • Threatened and Endangered Species – None	Planning
5. 3500 South Bus Rapid Transit	New bus rapid transit on 3500 South.	None expected	Planning
6. Draper Light-Rail Extension	Extension of existing north-south light rail to Draper.	Analysis in process; no data available	Planning
Salt Lake County Projects – Roadway			
7. Legacy Parkway, Davis and Salt Lake Counties[a] (FHWA 2005b)	Fourteen-mile, four-lane highway in Salt Lake and Davis Counties from I-15/U.S. Highway 89 to I-215.	• Farmland – 29 acres • Air Quality –Conforms to State Implementation Plan • Water Quality – No increase in overall pollutant levels • Wetlands – 113 acres • Wildlife Habitat – 700 acres • Threatened and Endangered Species – Potential noise disturbance to bald eagle from construction	Construction

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Project or Activity	Description	Impacts	Project Status
8. SR 201[a,b] (UDOT 2003)	Widening of and safety improvements on SR 201 from the Jordan River to 5600 West.	• Farmland – None • Air Quality – Conforms to State Implementation Plan • Water Quality – Improvements to water quality from stormwater system • Wetlands – 3.7 acres • Wildlife Habitat – Minor changes • Threatened and Endangered Species – None	Under construction
9. 3500 South, Salt Lake County[a,b] (UDOT 2006)	Widen 3500 South from Redwood Road to Bangerter Highway.	• Farmland – None • Air Quality – Conforms to State Implementation Plan • Water Quality – No increase in overall pollutant levels • Wetlands – None • Wildlife Habitat – None • Threatened and Endangered Species – None	Planning
10. 10400 South[a,b] (FHWA 2003)	Widen 10400 South from Bangerter Highway to Redwood Road.	• Farmland – None • Air Quality – Conforms to State Implementation Plan • Water Quality – Improvements from implementation of storm drainage system • Wetlands – None • Wildlife Habitat – None • Threatened and Endangered Species – None	Planning

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Project or Activity	Description	Impacts	Project Status
11. Redwood Road[a,b] (UDOT 2005)	Widen Redwood Road from two to five lanes from 10400 South to Bangerter Highway.	• Farmland – None • Air Quality – Conforms to State Implementation Plan • Water Quality – No impairment of the Jordan River or its tributaries • Wetlands – None • Wildlife Habitat – Minor changes • Threatened and Endangered Species – None	Construction
12. 11400 South[a,b] (FHWA 2005a)	Improve transportation system around 11400 South from Bangerter Highway to 700 East.	• Farmland – None • Air Quality – Conforms to State Implementation Plan • Water Quality – No impairment of the Jordan River or its tributaries • Wetlands – 0.57 acre • Wildlife Habitat – Between 0.33 acre and 3.54 acres of wildlife habitat affected, some near the Jordan River • Threatened and Endangered Species – Minor changes to habitat for the common yellowthroat	Planning
Utah County Projects – Transit			
13. Commuter Rail, Salt Lake and Utah Counties	Evaluation of commuter rail in Salt Lake and Utah Counties.	Analysis in process; no data available	Planning
14. University Parkway Bus Rapid Transit	New bus rapid transit on University Parkway.	None expected	Planning

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Project or Activity	Description	Impacts	Project Status
Utah County Projects – Roadway			
15. SR 92[b]	Widen existing road from I-15 to SR 146.	Analysis in process; the impacts below are estimates. • Farmland – None • Air Quality – Project conforms to State Implementation Plan • Water Quality – Increase in impervious surface could reduce water quality • Wetlands – 0 to 1 acre • Wildlife Habitat – Loss of 1 acre to 2 acres of habitat • Threatened and Endangered Species – None	Planning
16. Geneva Road[b]	Widen existing Geneva Road from 800 North in Orem to Center Street.	Analysis in process; the impacts below are estimates. • Farmland – 0 to 20 acres • Air Quality – Project conforms to State Implementation Plan • Water Quality – Increase in impervious surface could reduce water quality • Wetlands – 0 to 20 acres • Wildlife Habitat – Some loss of habitat east of Utah Lake • Threatened and Endangered Species – No impacts expected to June sucker, bald eagle, or Ute ladies'-tresses	Planning
17. Airport Road[b]	Build new road from I-15 to Provo Airport or Center Street.	Analysis in process; no data available	Planning
18. State Street[b]	Improve intersections and widen State Street from 2000 North in Orem to 100 East in American Fork.	Analysis in process; no data available	Planning
19. Springville Interchange[b]	Improve interchange on SR 77.	Analysis in process; no data available	Planning

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Project or Activity	Description	Impacts	Project Status
20. North Utah County East-West Connector[b]	Build new road north of Utah Lake from Redwood Road to I-15.	Analysis in process; the impacts below are estimates. • Farmland – 20 acres to 70 acres • Air Quality – Project conforms to State Implementation Plan • Water Quality – Increase in impervious surface could reduce water quality • Wetlands – 10 acres to 40 acres • Wildlife Habitat – Some loss of habitat • Threatened and Endangered Species – None	Planning
Salt Lake County and Utah County Projects – Roadway			
21. I-15 Salt Lake and Utah Counties[b]	Capacity and safety improvements to I-15 in Salt Lake and Utah Counties. Roadway improvements are planned from 12300 South in Salt Lake County to South Payson interchange	Analysis in process; the impacts below are estimates. • Farmland – 490 acres to 530 acres • Air Quality – Project conforms to State Implementation Plan • Water Quality – Increase in impervious surface could reduce water quality • Wetlands – 50 acres to 90 acres • Wildlife Habitat – Some loss of habitat east of Utah Lake • Threatened and Endangered Species – None	Planning

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Project or Activity	Description	Impacts	Project Status
22. Redwood Road (SR 68)[a,b] (UDOT 2007)	Widen Redwood Road from Bangerter Highway to the southern limits of Saratoga Springs.	• Farmland – 20.5 acres • Air Quality – Project conforms to State Implementation Plan • Water Quality – None • Wetlands – 0.03 acre • Wildlife Habitat – None • Threatened and Endangered Species – None	Planning

[a] Data from most recent environmental document; see reference.

[b] Included in UDOT 2007 Statewide Transportation Improvement Program.

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Table 25.3-2. Present and Reasonably Foreseeable Development Actions

Project or Activity	Description	Impacts	Project Status
Development in the study area	The area is developing quickly with traditional urban land uses (housing, commercial, retail, infrastructure, and institutional uses) through the 2030 planning period. The urbanized area is expected to increase from 30,500 acres in 2000 to about 70,000 acres in 2030. Development includes land developed as part of future roadway and transit projects identified in the long-range transportation plans. Large developments are listed below.	Loss of open space, farmland, wildlife habitat, and wetlands. Increase in air pollutant emissions, stormwater runoff, and noise.	Current and future land-development projects are expected to the year 2030. Some projects are currently being developed, and others are in the preliminary planning stages. Some of the 70,000 acres of development include anticipated urban growth based on population projections.
Salt Lake County			
1. Daybreak, South Jordan	20,785 housing units		
2. Stone Creek, West Jordan	965 housing units		
3. Rosecrest, Herriman and Bluffdale	5,500 housing units		
4. Independence, Bluffdale	3,600 housing units		
5. Bloomfield Estates, West Jordan	160 housing units		
6. Bloomfield Farms, West Jordan	80 units		
7. Bloomfield Heights, West Jordan	106 units		
8. Herriman Downtown, Herriman	350-acre site, number of housing units not identified		
9. Riverbend, Salt Lake City	2,000 housing units		
10. Suburban Land Reserve, Salt Lake City	Number of units not identified; in planning process		
11. West Bench, Salt Lake County	200,000 housing units		

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Project or Activity	Description	Impacts	Project Status
Utah County			
12. Traverse Mountain, Lehi	8,000 housing units		
13. Various developments, Eagle Mountain	25,390 housing units		
14. Various developments, Lehi	1,270 housing units		
15. Frank Gehry Point of the Mountain, Lehi	2,500 housing units		
16. Thanksgiving Meadows, Lehi	327housing units		
17. Thanksgiving Point, Lehi	328 housing units		

In 2003, the Utah Governor's Office of Planning and Budget outlined projected growth that is expected along the greater Wasatch Front. As shown in Figure 25-2, Greater Wasatch Area Developed Land 2030, much of the area that was undeveloped or agricultural in 2006 (see Figure 25-1, Greater Wasatch Area Developed Land 2006) is expected to be developed by 2030 based on current population growth rates. As shown in Figure 25-2, most of the agricultural land in the MVC study area is expected to be converted to urban development. Note that the Office of Planning and Budget uses different land-use classifications than those shown in Figure 25-1, which was prepared by the Utah Division of Water Rights.

25.4 Cumulative Impacts Analysis by Resource

As discussed in Section 25.2, Methodology for Determining Cumulative Impacts, CEQ guidance (CEQ 1997) was used to evaluate cumulative impacts. This chapter provides the foundation for determining the important issues to be evaluated as well as the past, present, and reasonably foreseeable projects to be considered in the analysis. Detailed information about the affected environment and direct impacts from the MVC is provided in the following chapters:

- Chapter 5, Farmlands
- Chapter 12, Air Quality
- Chapter 14, Water Quality
- Chapter 15, Ecosystem Resources (wetlands and wildlife habitat)

The following sections summarize the cumulative impacts identified in each chapter.

25.4.1 Farmlands

The potential cumulative impacts on the resources under study depend on future changes in land use. For the farmland cumulative impact analysis, the geographic scope is Salt Lake and Utah Counties. This area was selected based on the availability of data and because it is the likely area of development surrounding the MVC project. The total timeframe of the farmland cumulative impact analysis is about 1900 through 2030. The baseline for the farmland cumulative analysis is 2002, the year for which the most recent data were available from the Utah Division of Water Resources' Land Survey.

25.4.1.1 Past Trends

Although data on the amount of farmland available in the period between 1900 and the 1960s were not available for Salt Lake and Utah Counties, vast areas of each county were farmed to supply the local population. In 1960, although the

eastern areas of the two counties had been developed, the western valleys remained largely agricultural. In 1960, the Lower Jordan River Basin (which includes all of Salt Lake County) had about 93,000 acres of agricultural land. Between 1960 and 1994, the amount of agricultural land in this area declined to 43,800 acres. By 2002, the Utah Division of Water Resources' Land Survey noted only about 28,099 acres of agricultural land.

In 1966, in the Upper Jordan River Study Area (which includes Utah County and portions of the surrounding counties), there were about 172,700 acres of irrigated cropland. By 1995, the amount of irrigated cropland increased to 174,300 acres. However, the Utah Division of Water Resources' Land Survey did cite a decline in the total amount of land available for agriculture in Utah County from 211,259 acres in 1995 to 168,376 acres in 2002.

25.4.1.2 Future Trends

No data are available on the exact amount of agricultural land that will be converted to urban uses in the two counties. However, when one compares Figure 25-1, Greater Wasatch Area Developed Land 2006, to Figure 25-2, Greater Wasatch Area Developed Land 2030, it is evident that regional development would result in a greater-than-50% loss of agricultural land. If loss of agricultural land in Utah and Salt Lake Counties is greater than 50%, there could be an overall reduction in agricultural land of about 100,000 acres.

25.4.1.3 MVC Project Impacts

All of the MVC alternatives would result in a direct loss of about 1,500 acres or less of agricultural land (or less than 1% of the total agricultural land currently in Salt Lake and Utah Counties). Other planned transportation projects listed in Table 25.3-1 above, Present and Reasonably Foreseeable Transit and Roadway Actions, would result in less than 700 acres of additional impacts to agricultural land; the main contributor will continue to be urban growth that will occur between 2002 and 2030 in the two counties. This growth and development will occur with or without the MVC project. No data are available on the exact amount of agricultural land that will be converted to urban uses in the two counties but, as described in Section 25.4.1.2, Future Trends, it is expected that there will be a greater-than-50% loss of agricultural land, or about 100,000 acres. Overall, due to the planned conversion of existing agricultural land to residential or commercial uses in the next 30 years, the cumulative impact on agricultural land is expected to be near a 50% loss of agricultural land. Overall, the MVC project would contribute to about 1.5% of the total loss in farmland.

25.4.1.4 Mitigation

Chapter 5, Farmlands, provides a detailed discussion of farmland mitigation measures. The mitigation measures include the following:

- Owners of farmland and farm-related businesses within the MVC right-of-way will be compensated according to the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, and other state and federal guidelines if the owners' properties are affected by project construction.
- Any topsoil removed from areas of prime farmland and farmland of statewide importance will be scraped and stockpiled rather than covered over. The salvaged topsoil will be reapplied to disturbed slopes, seeded, and mulched or otherwise stabilized.

25.4.2 Air Quality

For the air quality cumulative impact analysis, the geographic scope is Salt Lake and Utah Counties. This area was selected based on the availability of data and because it would be directly affected by the MVC project. The total timeframe for the air quality cumulative impact analysis is about 1990 through 2030. The baseline for the air quality cumulative analysis is 2005, using data from the Utah Division of Air Quality's Annual Report for 2005 (Utah Division of Air Quality 2006).

25.4.2.1 Past Trends

Overall air quality in Salt Lake and Utah Counties has been improving. In the past 25 years, Utah has made enormous progress in improving air quality. In the early 1980s, the health standards for four of the six criteria pollutants (carbon monoxide [CO], ozone, particulate matter, and sulfur dioxide, but not lead or nitrogen dioxide) identified by EPA were violated in one or more Utah counties. Currently, two of the six criteria pollutants identified by EPA, ozone and particulate matter (PM_{10}), occasionally reach levels that can affect the health and well-being of Utah's urban residents who are more sensitive to pollution, such as children, the elderly, and those with chronic health problems. These pollutants can aggravate respiratory disorders during periods of high pollution and lead to chronic illness (Utah Division of Air Quality 2006).

Historically, Utah had problems meeting the National Ambient Air Quality Standard for CO; however, it has been many years since violations occurred. In March 2004, a request was submitted to EPA to redesignate Provo as an attainment area for CO along with the associated maintenance plan. This request

was approved in December 2005 and became effective on January 3, 2006. The plan demonstrated that there was no longer a need for oxygenated fuels and revised the transportation conformity budget to be consistent with EPA's latest mobile emissions model, MOBILE6. All areas with historic CO problems are now designated as attainment areas for CO. The charts below show the historic air quality trends for five of the six criteria pollutants along the Wasatch Front (Utah Division of Air Quality 2006). Figure 25-6, Air Quality Monitoring Stations – Salt Lake and Utah Counties, provides the location of the monitoring stations in Salt Lake and Utah Counties noted in the charts.

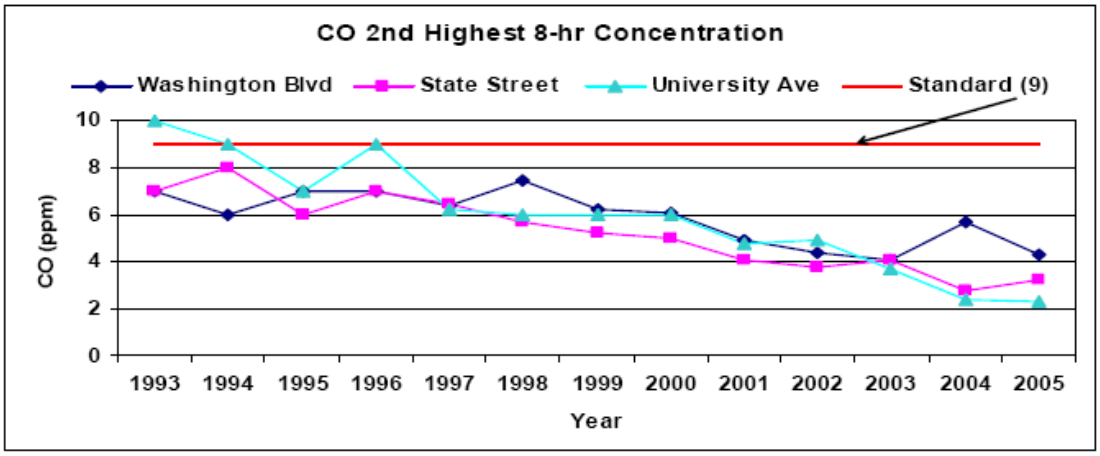

Chart 25-2. CO Second-Highest 8-Hour Concentration

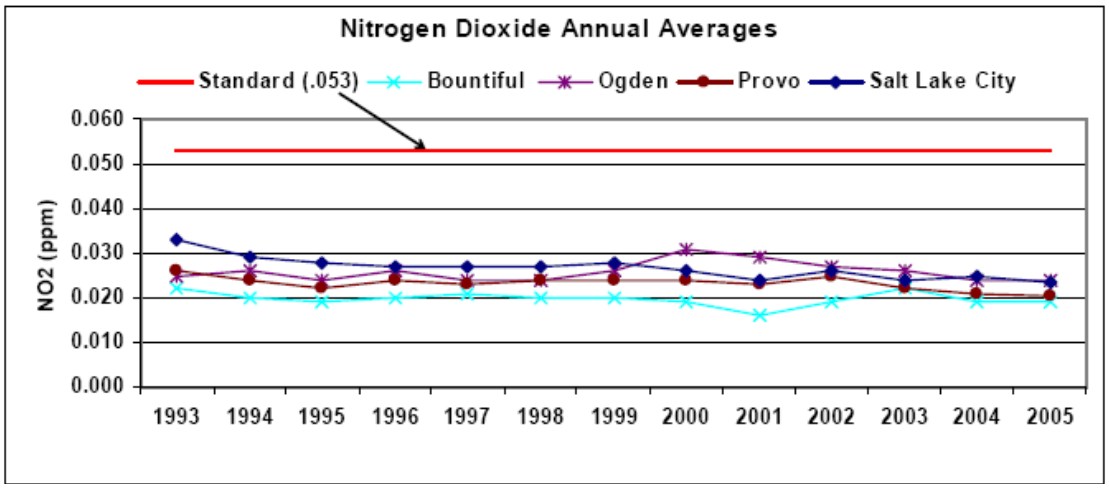

Chart 25-3. Nitrogen Dioxide Annual Averages

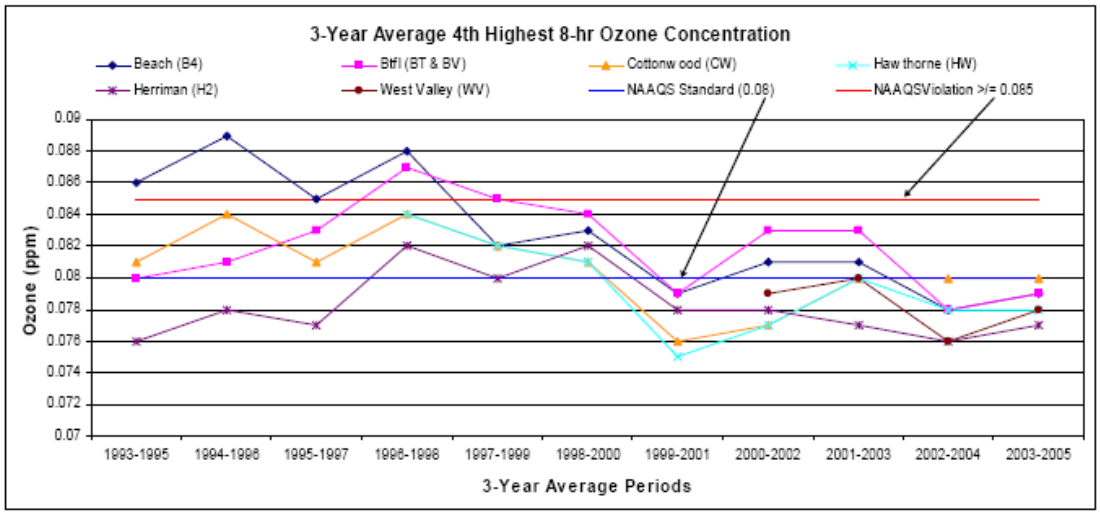

Chart 25-4. Three-Year Average Fourth-Highest 8-Hour Ozone Concentration

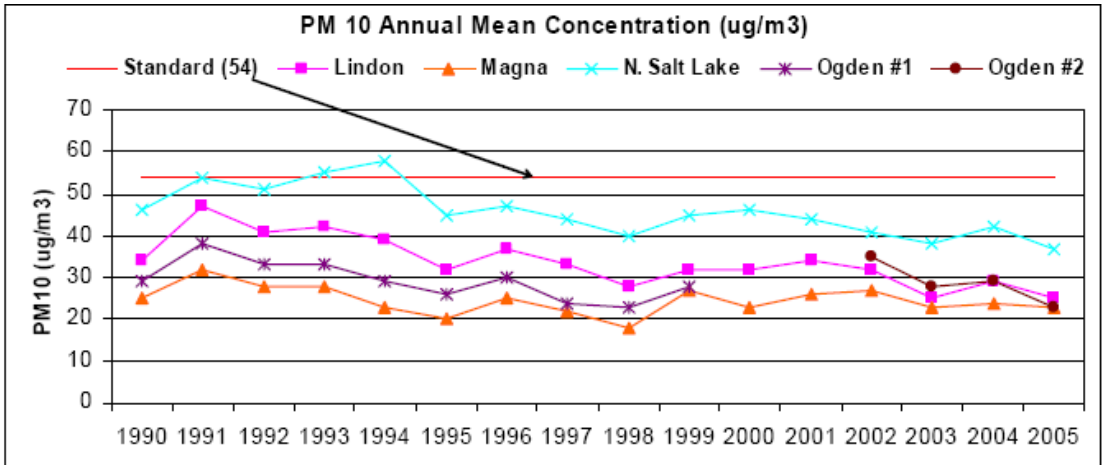

Chart 25-5. PM_{10} Annual Mean Concentration

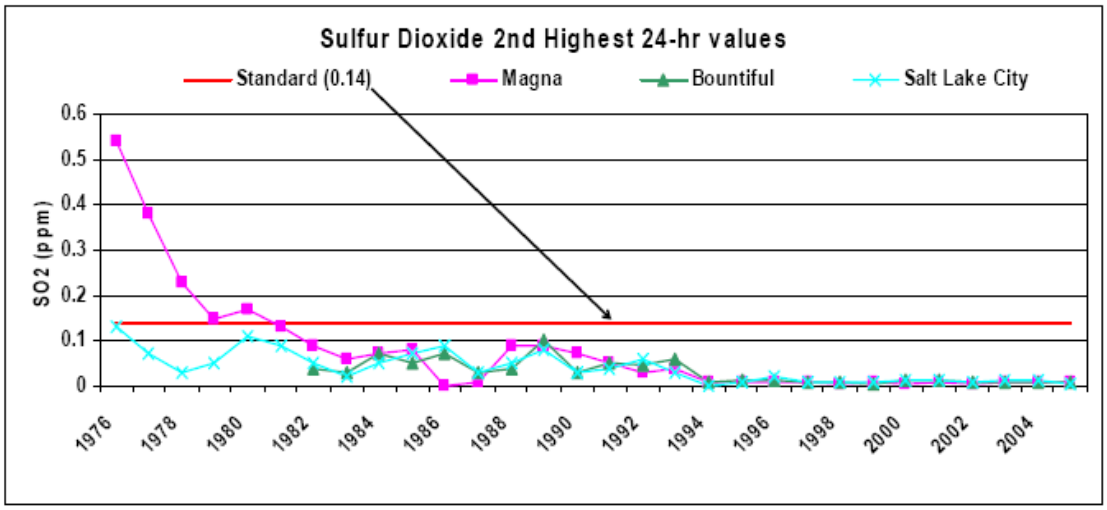

Chart 25-6. Sulfur Dioxide Second-Highest 24-Hour Values

No charts were available for lead; however, Utah has not exceeded the health standard for lead since the late 1970s (Utah Division of Air Quality 2006).

25.4.2.2 Future Trends

With improvements to vehicle emissions and more stringent air quality controls, it is expected that air quality will continue to improve along the Wasatch Front through the 2030 planning period.

25.4.2.3 MVC Project Impacts

Regional modeling conducted by the Wasatch Front Regional Council and the Mountainland Association of Governments for the 2030 transportation conformity analyses demonstrated that all regionally significant transportation projects (including the MVC) would be in compliance with the National Ambient Air Quality Standards. Population growth in the air quality impact analysis area has had little effect on overall air quality as demonstrated by the continuing improvement in air quality throughout the region. Air pollutant emissions from the MVC alternatives would increase slightly due to the increase in vehicle-miles traveled because of improved mobility.

Overall, the growth in the area by 2030 would likely be the same with or without the MVC project. However, the project would help reduce regional traffic congestion and improve travel times, which could help maintain compliance with air quality standards. Improved travel times throughout the region would reduce idling emissions of CO and volatile organic compounds.

Fugitive Dust. During construction of the project and other developments in the MVC study area, fugitive-dust-control measures would be needed in certain areas to protect disturbed soils from wind erosion until permanent, stabilized cover is established. After the construction phase is completed, the soil would have a lower potential for wind erosion compared to its undeveloped state.

Vehicle Emissions. Vehicle emissions have continued to decrease substantially over time as EPA has imposed a series of tighter emission-control requirements on engine emissions. As the region's vehicle fleet becomes newer and the older, high-emitting vehicles are replaced, it is expected that the tighter emission standards will substantially offset the regional growth in vehicle-miles traveled. Although it is difficult to predict fleet-average emissions 20 to 30 years in the future, it is expected that the more stringent federal regulation of motor vehicle emissions will continue to drive vehicle emissions even lower, thus helping to offset the growth in vehicle-miles traveled.

Mobile-Source Air Toxics (MSATs). See Chapter 12, Air Quality, for more detailed information on MSATs. Most air toxics originate from human-made sources including on-road mobile sources, non-road mobile sources (such as airplanes), area sources (such as dry cleaners), and stationary sources (such as factories or refineries). MSATs are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

EPA is the lead federal agency for administering the Clean Air Act and has specific responsibilities for determining the health effects of MSATs. On March 29, 2001, EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources (66 Federal Register 17229). In its rule, EPA examined the impacts of existing and newly promulgated mobile-source control programs, including its reformulated gasoline program, its national low-emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur-control requirements, and its proposed heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur-control requirements. Between 2000 and 2020, the Federal Highway Administration (FHWA) projects that, even with a 64% increase in vehicle-miles traveled, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57% to 65% and will reduce on-highway diesel particulate emissions by 87%.

In February 2007, EPA issued a final rule to reduce hazardous air pollutants from mobile sources. The final standards will lower emissions of benzene and other air toxics in three ways: (1) by lowering the benzene content in gasoline, (2) by reducing exhaust emissions from passenger vehicles operated at cold temperatures under 75 °F (degrees Fahrenheit), and (3) by reducing emissions that evaporate from, and permeate through, portable fuel containers.

Under this rule, EPA expects that new fuel benzene and hydrocarbon standards for vehicles and gas cans will reduce total emissions of mobile-source air toxics by 330,000 tons in 2030, including 61,000 tons of benzene. As a result, new passenger vehicles will emit 45% less benzene, gas cans will emit 78% less benzene, and gasoline will have 38% less benzene overall.

$PM_{2.5}$. On March 29, 2007, EPA issued a rule defining requirements for state plans to clean the air in areas with levels of fine particle pollution ($PM_{2.5}$) that do not meet national air quality standards. It is anticipated that portions of Salt Lake and Utah Counties will be designated as non-attainment areas under the revised $PM_{2.5}$ standard (35 µg/m^3, or micrograms per cubic meter). Non-attainment designations under the revised standard will be in place by the end of 2009, and conformity to the new standard will be required in 2011.

By 2013, Utah will be required to submit a new section to the State Implementation Plan documenting how the State will meet the revised $PM_{2.5}$ standard. Once the $PM_{2.5}$ State Implementation Plan is approved by EPA, WFRC and MAG will be required to make a conformity determination verifying that transportation-related emissions are within the limits established in the Plan. During the interim period from 2011 when $PM_{2.5}$ conformity is required to 2013 when emission limits are established in the Plan, WFRC and MAG will be required to establish conformity by demonstrating that future $PM_{2.5}$ emissions are lower than 2002 levels.

25.4.2.4 Mitigation

As described in Chapter 12, Air Quality, FHWA and UDOT conclude that the proposed MVC project would not have a substantial impact on regional air quality, so no mitigation measures are proposed for direct impacts from use of the MVC. Potential construction-related air quality mitigation measures are described in Chapter 21, Construction Impacts, and include development of a Fugitive Dust Emission-Control Plan, street sweeping, and maintaining equipment to reduce emissions.

25.4.3 Water Quality

This section provides an overview of the cumulative impacts to water quality from the MVC project and other actions in the area. The geographic scope of this analysis includes the Utah Lake–Jordan River Watershed Management Unit which lies in north-central Utah and includes those streams that drain into Utah Lake and the Jordan River and its tributaries from Utah Lake to the Great Salt Lake. The timeframe of the water quality cumulative impact analysis is about the mid-1970s through 2030. The mid-1970s were selected as the early date for the analysis based on the availability of data. The baseline year selected for the analysis is 2005 based on the availability of 2005 water quality data.

25.4.3.1 Past Conditions

The rivers and lakes in the Utah Lake–Jordan River Watershed Management Unit have been extensively altered as a result of urban and agricultural development during the past century. Many of the streams that flowed into Utah Lake, the Jordan River, and the Great Salt Lake have been altered for water supplies, control of stormwater, agricultural uses, and urban development. For example, the Jordan River has been altered to reduce its potential for flooding and to allow for urban and agricultural development. As development occurred in the area, the amount of impervious surfaces, sewage-treatment plants, and agricultural areas increased, all of which reduced water quality through the early 1970s.

The decrease in water quality was analyzed in the *Utah Lake–Jordan River Watershed Management Unit Stream Assessment* (Utah Division of Water Resources 2002). This report estimated that there are 1,314 perennial stream-miles in the Utah Lake–Jordan River Watershed Management Unit, of which 1,025 miles (78.0%) were assessed for support of their designated beneficial uses. Of these 1,025 miles, 848.5 miles (82.7%) were determined to fully support all their beneficial uses, 108.3 miles (10.6%) were determined to partially support their beneficial uses, and 68.4 miles (6.7%) were determined to not support at least one designated beneficial use. The streams that do not support their beneficial use(s) are considered impaired waters.

The major causes of impairment (rivers that don't support their beneficial use) were metals, habitat alterations, flow alterations, and pH. The major sources of impairment were resource extraction, habitat modification, hydromodification, and agricultural activities. Table 25.4-1 below lists the sources of water quality impairment for streams in the Utah Lake–Jordan River Watershed Management Unit.

Table 25.4-1. Sources of Water Quality Impairment in the Utah Lake–Jordan River Watershed Management Unit, 2002

Source	Contribution to Impairment
Resource extraction	19.4%
Unknown	18.1%
Habitat modification	16.7%
Agricultural	14.7%
Hydromodification	14.7%
Urban runoff	6.2%
Industrial point sources	4%
Municipal point sources	4%
Natural sources	2.1%

Source: Utah Division of Water Quality 2002

Within the past several decades, a number of regulatory programs have evolved that control stormwater and restrict direct disturbances of water bodies. The 1987 revisions to the Clean Water Act placed a new emphasis on the requirement for cities and counties to obtain permits for stormwater discharges and to mitigate impacts. In addition, the State of Utah requires approval for any project that proposes to disturb any area within the ordinary high-water mark of a stream or lake and controls the amount of disturbance to the water body and requires restoration for any impacts. USACE also regulates impacts to wetlands and navigable waters of the U.S.

The above regulatory controls have resulted in improved water quality in the Jordan River, which is the main water body within the MVC study area. The quality of water has improved since the passage of the 1972 Clean Water Act. Regulations on municipal waste from wastewater treatment plants, stormwater runoff, and industrial discharges have reduced concentrations of pollutants discharged into the Jordan River (Hooton 1999). In addition, the Jordan River Water Quality Total Maximum Daily Load Assessment (Utah Division of Water Quality 2005) noted that the water quality of the Jordan River has generally improved since implementation of a Section 208 Water Quality Plan in 1975.

25.4.3.2 Future Trends

The regulatory programs briefly summarized above assure that the rate of hydrologic and water quality degradation in developing areas will be greatly reduced from those that historically occurred. However, the future water resource conditions in the water quality cumulative impact analysis area are difficult to predict accurately. For example, as urban development in the area continues, the amount of impervious surfaces will increase, but other pollutant sources from

agriculture and resource extraction will decrease (as these lands will be converted to urban uses), thus making an overall assessment of future water quality conditions difficult. Stormwater regulations could continue to evolve, resulting in new rules such as stricter controls from construction sites and new urban development.

25.4.3.3 MVC Project Impacts

Any of the MVC action alternatives would increase the amount of impervious surface by about 1,000 acres to 1,100 acres, which would increase the potential for stormwater pollution. However, the analysis conducted for the MVC project showed that the increase in the amount of impervious surface would not change the beneficial-use classifications of or further impair water bodies in the area. In addition, the MVC project would include measures to control stormwater runoff and would use detention basins to minimize the amounts of pollutants that are discharged into nearby surface waters. Other transportation projects in the region are also not expected to contribute to major stormwater runoff or reduce water quality because of the controls that would be placed on each project to manage runoff and minimize water quality impacts.

The other transportation-related projects listed in Table 25.3-1 above, Present and Reasonably Foreseeable Transit and Roadway Actions, are not expected to contribute to major stormwater runoff or reduce water quality because of the controls that are placed on projects to manage runoff and minimize water quality impacts. In addition, many of these projects are improving existing roads that have no stormwater controls by adding control measures that could reduce water quality impacts. It is likely that one of the greatest contributors to future water quality impacts will be the urban development that is converting existing undeveloped land into residential, industrial, and commercial uses.

Urban runoff is the cause of about 6.2% of the water quality impairment for streams in the Utah Lake–Jordan River Watershed Management Unit (see Table 25.4-1 above, Sources of Water Quality Impairment in the Utah Lake–Jordan River Watershed Management Unit, 2002). However, as development increases, this contribution will likely increase. Although development in the water quality cumulative impacts analysis area will occur with or without the MVC project, roadway improvements in general could contribute to some development growth. It is expected that the amount of urbanized area along the Wasatch Front will increase from about 30,000 acres currently to about 70,000 acres in 2030, an increase of 40,000 acres. This urbanization would include all residential and commercial areas and the necessary infrastructure such as roads (including roads like the MVC). Not all of the 40,000 acres would be impervious surfaces, since the typical amount of impervious land cover in residential areas can vary from 12% to 40% and for commercial areas from 60% to 95% (Canter 1996).

The continued urbanization of Salt Lake and Utah Counties could result in cumulative impacts to and degradation of water quality. However, this increase in urbanization would also decrease the amount of agriculture and resource extraction, which are two of the larger factors that impair water quality. It is also likely that, in the future, regulatory controls would be increased to reduce water quality impacts.

25.4.3.4 Mitigation

Chapter 14, Water Quality, provides a detailed discussion of water quality mitigation measures. The mitigation measures include following:

- Develop an erosion-control plan during construction.
- Use detention basins for the MVC project to detain runoff and reduce peak flow rate.
- Maintain groundwater conveyance under the MVC roadway.

25.4.4 Ecosystem Resources

This section provides an overview of the cumulative impacts to the ecosystem from the MVC project and other actions in the area. The ecosystems cumulative analysis includes impacts to wildlife and wetland habitat. Because the Preferred Alternative for the project in Utah County (2100 North Freeway Alternative) would have no effect on any threatened or endangered species including the Ute ladies'-tresses, no cumulative impacts are expected for threatened or endangered species. The Southern Freeway Alternative and Arterials Alternative would affect less than 1.5 acres each of potential and known habitat for the Ute ladies'-tresses but would not adversely affect the species. Overall, no cumulative impacts to threatened or endangered species are expected from the MVC project.

The geographic scope of this analysis includes the Salt Lake, Utah, and Tooele Valleys. These three valleys were selected because they are used by migratory birds that use the wetlands as feeding and resting areas during migration, and because a decrease in wildlife habitat and wetlands in Salt Lake County could affect bird and other local wildlife populations in Tooele County. The timeframe of the cumulative impact analysis is about from the mid-1800s (pre–European settlement) through 2030. The change from historic to current wetlands and habitat availability was estimated using regional scale land cover data (Jones & Stokes 2005). The baseline year selected for the analysis (2003) was based on 2003 land cover data.

25.4.4.1 Past Conditions

Wildlife habitat, wetlands, rivers, and lakes in the Salt Lake, Utah, and Tooele Valleys (Jordan River hydrologic unit, Utah Lake hydrologic unit, and Tooele Valley hydrologic unit, respectively) have been extensively altered as a result of urban and agricultural development during the past century. The wetlands adjacent to Utah Lake and the Great Salt Lake have been extensively altered or lost, and many of the streams that flowed into Utah Lake, the Jordan River, and the Great Salt Lake have been altered for water supplies, control of stormwater, agricultural uses, and urban development. Much of the upland wildlife habitat has also been developed, and only a few areas remain on the west side of the Salt Lake and Utah Valleys. In the three valleys, there has been about a 55% reduction in wetlands and wildlife habitat. The extent of estimated historic wetlands and wildlife habitats and the current conditions are listed below.

- About 45% of the estimated historic wetlands and wildlife habitats are still available in the area.
- The remaining habitat is estimated below.
    - Salt Lake Valley – 38% (37,333 acres)
    - Utah Valley – 17% (11,100 acres)
    - Tooele Valley – 80% (56,379 acres)

Based on National Wetland Inventory data, Salt Lake County has about 7,900 acres of wetlands remaining from the historic estimate of 19,500 acres. Utah County has about 11,018 acres remaining out of the historic estimate of 66,200 acres. This is a loss of about 64% and 83%, respectively.

25.4.4.2 Future Trends

The USACE regulatory wetland program was put in place to mitigate the loss of wetlands and other waters of the U.S. through avoidance, minimization, and creation or restoration of these resources. The resulting federal policy is “no net loss of wetland acres and/or function.” Although the amount of future wetlands and the associated aquatic habitat conditions are difficult to predict, these resources could be degraded by encroachment, fragmentation, and/or hydrologic modification. For example, a new road might be adjacent to an emergent marsh or might bisect the marsh. Even if the impacts from the road are mitigated, the result might be wetlands that provide diminished wildlife habitat function for some species. Similarly, such a project could alter the movement of surface water or groundwater, resulting in the direct loss of wetlands outside the MVC study area.

Since no regulatory program protects uplands, the associated upland wildlife habitat (such as winter foraging areas) will continue to be developed in the future as the population in the area grows. The expected 40,000 acres in new development will affect upland habitat and some wetland habitat. Other reasonably foreseeable transit and roadway projects in the area could affect between 250 acres and 350 acres of wetlands (see Table 25.3-1 above, Present and Reasonably Foreseeable Transit and Roadway Actions), but these impacts would be mitigated. Overall, based on the projected estimates of population growth and population densities, there will continue to be a trend of converting wetlands and wildlife habitat to increasingly dense levels of development.

25.4.4.3 MVC Project Impacts

All of the MVC alternatives would result in a loss of wildlife habitat and wetlands. The approximately 150 acres of affected wildlife habitat would be less than 1% of what could be lost to anticipated development (about 40,000 acres by 2030) (Envision Utah 2003). With the continued development along the Wasatch Front, much of the existing wildlife habitat on the valley floors would be lost. Because the steep topography limits some development in the foothills, these areas would experience less impacts to wildlife habitat.

All MVC alternatives would result in impacts to some wetlands, and up to 472 acres could be affected (direct and indirect impacts). Although other planned transportation projects could also result in impacts to wetlands, urban growth, regardless of the construction of roads and rails, will likely cause the greatest impact to wetlands between 2002 and 2030. However, all projects that are subject to a Section 404 individual permit are required to identify the least environmentally damaging practicable alternative, which is the goal of the wetland assessment component of this EIS process. In addition, all projects are required to complete a wetland delineation from which mitigation is determined through avoidance, minimization, and/or some form of creation, restoration, or enhancement of wetlands. No data are available on the exact amount of wetlands to be converted to urban uses because each project is treated independently by USACE. It is expected that all direct impacts will have to be mitigated (through creation, restoration, or enhancement of wetlands) within the general vicinity of the project to satisfy the federal policy of no net loss of wetland acres and/or function.

25.4.4.4 Mitigation

Chapter 15, Ecosystem Resources, provides a detailed discussion of mitigation measures for wildlife and wildlife habitat, vegetation, wetlands, and threatened and endangered species. The mitigation measures include following:

- Develop and implement wetland mitigation sites that result in an overall no net loss of wetland functions affected by the MVC project.
- Provide wildlife crossings and fencing in appropriate areas.

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